SR-24 Williams Gateway Freeway, Ellsworth Road – Ironwood Road

Interim Phase II Feasibility Study

600-0110-14

FINAL

March 18, 2015

Prepared For:

MARICOPA ASSOCIATION of GOVERNMENTS

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Project Introduction

Executive Summary

The purpose of this Task Order is to complete a feasibility study and establish an interim extension of the State Route 24 (SR 24) Freeway from its current terminus at Ellsworth Road in the City of Mesa to Ironwood Road in Pinal County. That purpose also includes the development of planning-level financial assumptions and estimates of probable costs for alternative interim extension concepts. The proposed project is within the Arizona Department of Transportation's (ADOT) Phoenix District. A design concept report (DCR) and environmental assessment (EA) completed by ADOT in (April) 2011 established a recommended alternative, right-of-way limits, and estimates for design and construction for an ultimate freeway from SR 202L to Ironwood Road.

Design and construction of the first 1.5 miles of the ultimate SR-24 freeway from the SR 202L to Ellsworth Road was completed in 2013. ADOT spent approximately $81 million on design and construction and $36 million on right-of-way to complete this segment.

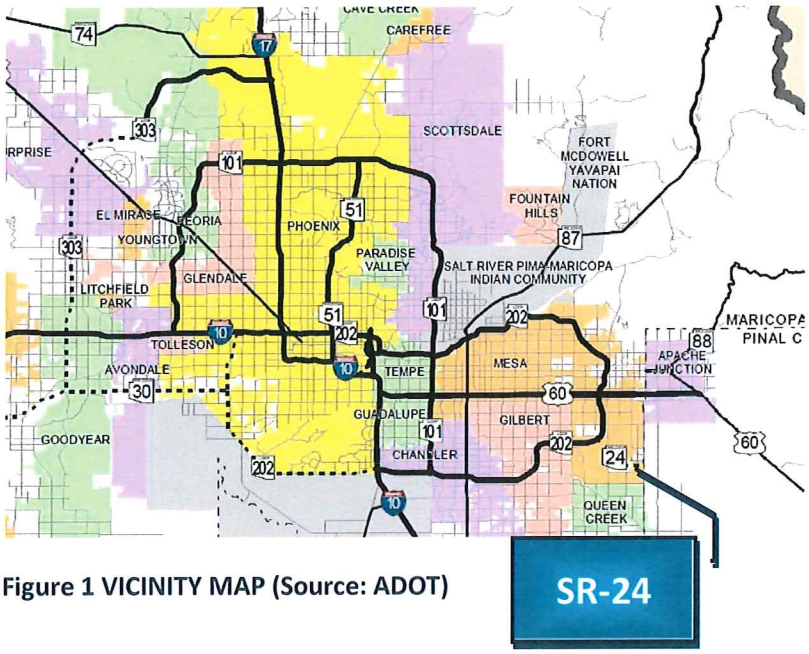

Figure 1 VICINITY MAP (Source: ADOT)

The goals for developing an interim solution for the remaining 4.6 miles of the proposed corridor from Ellsworth Road to Ironwood road are as follows:

- Promote economic development by linking future economic activity centers, supporting future population and employment growth sooner rather than later with an interim solution.
- Provide a corridor with the projected capacity to improve transportation options between the cities of Mesa and Apache Junction and the towns of Gilbert and Queen Creek, in Maricopa and Pinal Counties in the southeast Valley.

This Task Order included the following subtasks:

- **Task 1:** Studied projected traffic to determine the number of mainline lanes and intersections for an effective interim solution.
- **Task 2:** Developed cost opinions for right-of-way acquisition.
- **Task 3:** Developed cost opinions for an interim and ultimate highway facility.

As illustrated in Figure 1, conceptual corridors were developed and are separated into three segments:

- **Segment 1:** Ellsworth Road to Signal Butte Road
- **Segment 2:** Signal Butte Road to Meridian Road
- **Segment 3:** Meridian Road to Ironwood Road

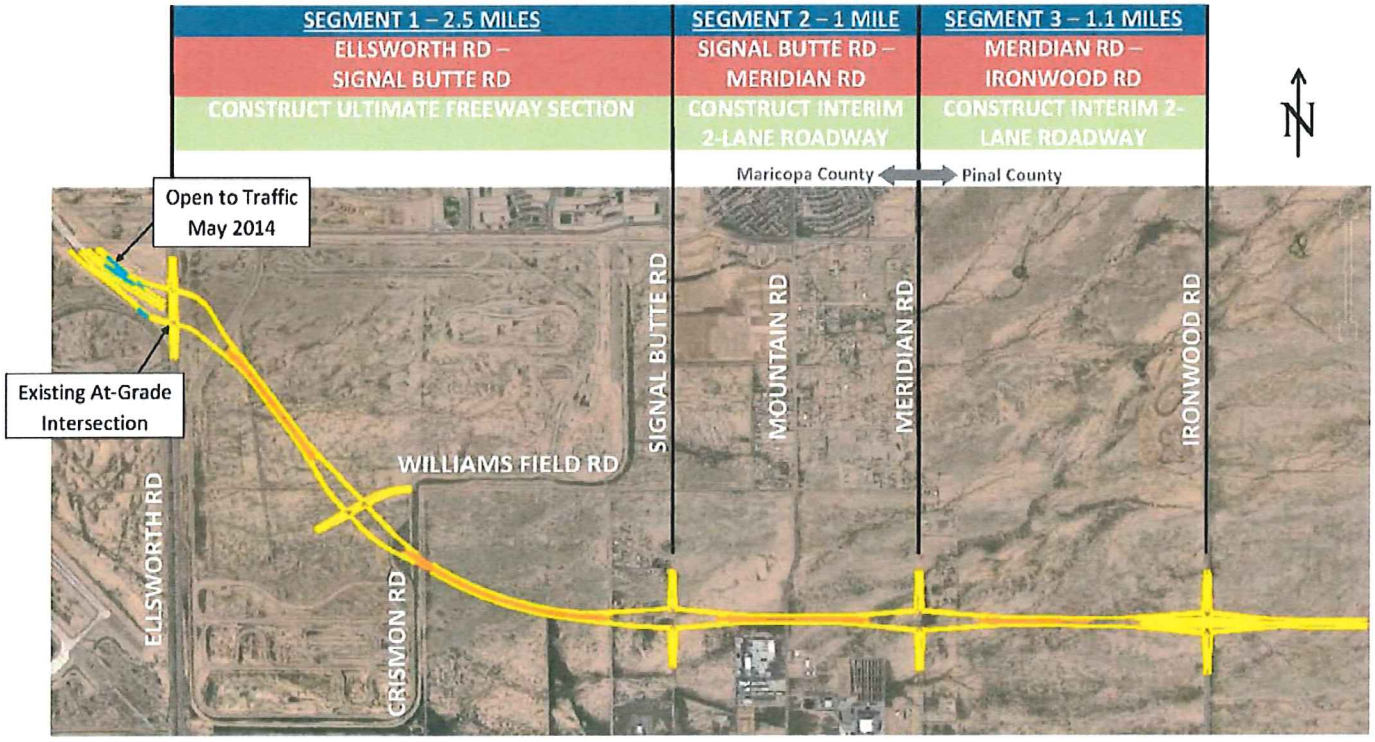

Figure 2 - The SR-24 Proposed Corridor Map

Within each segment, four cost opinions based on different options for right-of-way purchase have been considered and are summarized in Tables 1, 2, 3, and 4. Cost opinions varied among the right-of-way options presented, from $39 million to just over $71 million. Also within each segment, several options were developed for the ultimate and interim construction cost opinions, which are summarized in Tables 5 through 9. Cost opinions varied among the construction options presented, including design costs from $34 million to just over $56 million for interim solutions.

An ultimate opinion was developed for Segment 1 only, at an estimated $65 million (Table 5). Tables 6 and 7 summarize the cost estimates provided in the ADOT final DCR for the ultimate structures and drainage system, respectively.

Task Order Background

The purpose of this Task Order is to complete a feasibility study and establish an interim extension of the SR 24 Freeway from its current terminus at Ellsworth Road in the City of Mesa to Ironwood Road in Pinal County. This task order will include the following updates:

- **Task 1:** A background traffic study identifying levels of service of 2015 and 2035 travel demand for cross roads and other principal arterial intersections within the planned SR-24 corridor.
- **Task 2:** Cost opinion for right of way acquisition
- **Task 3:** Cost opinions for design and construction of an interim and ultimate four-lane at-grade divided highway facility with grading for future grade separation freeway overcrossings.

The Williams Gateway Corridor is an integral part of the Maricopa Association of Governments (MAG) Regional Transportation Plan (RTP) adopted by the MAG Regional Council in November 2003 and endorsed one year later by voters in connection with their approval of Proposition 400. This proposed SR-24 corridor begins at the Santan Freeway (SR 202L) in the vicinity of Williams Gateway Airport and will one day continue eastward to the Maricopa/Pinal county line at Meridian Road. From there, ADOT is currently conducting a Corridor Definition Study to continue the route eastward through Pinal County to potentially link with SR 79 south of US 60 and the future north–south freeway currently under study. The SR-24 corridor between SR 202L and Ironwood road is approximately 6 miles long.

The timeline of events is summarized below:

- In November 2004, as a part of the county's RTP, the Maricopa County portion of the Williams Gateway corridor was included in the list of projects to be funded with the sales tax approved by voters.
- Originally, preliminary engineering (Phase I) for the Williams Gateway Freeway was scheduled in the MAG RTP for 2005–2010 (Phase I), with funding for final design and right-of-way protection provided in Phase II (2011–2015). ADOT was to have constructed the Maricopa County portion (to Meridian Road) of the facility during Phase III (2016–2020).
- In 2006, the MAG identified a preferred alignment for SR-24.
- On October 28, 2009, in response to a projected budget shortfall of $6.6 billion brought on by the recession, MAG modified the RTP to suspend funding for the Williams Gateway Freeway.
- In 2011, the City of Mesa announced it would provide $148 million to advance construction of the first 1.5 miles of the freeway between the Santan Freeway and Ellsworth Road. ADOT advanced construction of the interim facility from fiscal year 2016 to fiscal year 2012.
- On March 30, 2012, Mesa officials announced plans to start construction of SR-24.
- The first phase (1.5 miles) between SR 202L and Ellsworth Road was designed and constructed, and opened to traffic on May 4, 2014.

According to the current 20-year phased transportation development program incorporated in the 2035 MAG RTP Regional Transportation Plan (RTP dated, January 2014) the SR-24 corridor was identified for right-of-way protection as a Group 3 (FY 2027 - FY 2035) project.

Task 1: Traffic Study

Task 1 began with a background traffic study to identify the levels of service (LOS) for 2015 and the 2035 travel demand for cross roads and other principal arterial intersections within the planned SR-24 corridor. This effort required that we:

1. Analyze a full traffic interchange (TI) for Ellsworth Road.
2. Discuss traffic volumes for an interim freeway.
3. Discuss ultimate future TI locations.
4. Discuss existing access at 222nd Street (1/4 mile west of Signal Butte Road) and S. Mountain Road (cul-de-sac and menu item for overpass).
5. Discuss a SR-24 interim TI at Ironwood Road.

Based on the design concept report completed by ADOT in April 2011, the proposed SR-24 traffic volumes projected for 2030 were approximately 50,000 vehicles per day (vpd), with a peak hour volume of approximately 5,000 vehicles per hour. According to the ADOT Transportation Data Management System (TDMS) in September 2014, the current volumes on the newly completed section of SR-24 between SR 202 and Ellsworth Road are approximately 2,500 vehicles per hour during the peak hours, with a daily traffic count of 32,000 vpd. ADOT's TDMS also provided 2012 traffic volumes along Ellsworth Road near the proposed intersection with SR-24, but prior to opening the SR-24 freeway between SR 202 and Ellsworth Road. Those 24-hour traffic volume counts were approximately 30,000 vehicles per day (both directions, combined).

Using the 2012–2014 ADOT traffic counts provided by TDMS, the computer software Synchro/SIM Traffic was used to determine the AM and PM weekday peak hour LOS using the existing lane (as of November 2014) configuration at the SR-24 intersection with /Ellsworth Road. LOS is a qualitative measure of the overall operation of a roadway segment or an intersection; it is expressed as LOS A to LOS F. LOS A represents little to no congestion; LOS F represents a considerable level of congestion, long queues, and delays conditions. The newly completed SR-24 intersection with Ellsworth Road is now operating at a LOS D/E in the AM peak hour and at a LOS B/E in the PM peak hour.

To obtain 2035 traffic volumes, the (2012) existing traffic volumes were projected using a 2 percent annual growth rate. An assumption was made that 10 percent of the vehicles traveling to/from the west would be traveling to/from the east to determine volumes for the future diamond traffic interchange. The 2035 AM and PM weekday LOSs were then calculated with the ultimate lane configuration shown in the DCR. That future SR-24/Ellsworth Road TI is anticipated to operate at a LOS F/D during the AM peak hour and a LOS D/F during the PM peak hour.

The SR-24 intersection with Ellsworth Road is already functioning today as an interim at-grade intersection, with future plans for a grade separated traffic interchange. Other cross roads within the limits of this study and the DCR currently have no intersection with SR-24, although 4 more are currently planned, to coincide with future development. For the purposes of this study, projected traffic volumes for the Ellsworth Road intersection were extrapolated to evaluate future TIs at Williams Field, Signal Butte, Meridian Road, and Ironwood Road. As such and when opened, those intersections would operate at an LOS similar to Ellsworth Road.

If the existing two-way traffic volumes on SR-24 are projected using a 2 percent annual compounded growth rate, the projected 2035 traffic volume along SR-24 is approximately 49,000 vpd. The 2030 project traffic volume provided in the final DCR along SR-24 is 50,000 vpd. For this analysis, a future traffic volume of 50,000 vpd was used to determine the anticipated LOS along SR-24 with an interim freeway configuration of two through lanes in each direction. This two lanes in each direction interim configuration was selected because the area of proposed freeway has virtually no existing development or cross roads between Ellsworth and Ironwood roads, an interim freeway is proposed with two lanes in each direction. With the projected 2030 traffic volumes this segment of the freeway is anticipated to operate at a LOS C (HCM Exhibit 11-6 LOS for Basic Freeway Segments).

An alternative for an interim roadway would include connecting the ultimate ramps at Ellsworth Road to the east, aligning with the existing ramps from SR 202 west of Ellsworth Road. The existing ramps from SR 202 (eastbound and westbound) and Ellsworth Road are signalized intersections; those intersections would be modified to include the new ramps to the east. One alternative for an interim freeway going east to Ironwood would include a combination of ultimate mainline freeway and on- and off-ramps at proposed TI locations, similar to what is currently constructed for portions of SR303L between Happy Valley Road and Interstate 17 (I-17). Because none of these roadways currently exist or are planned to exist in the near term, another interim alternative is to build the freeway at grade through those proposed interchanges and then either require the developer to build the interchanges with cross roads over the freeway or plan to build those interchanges in future years when development in the area requires cross roads at Williams Field, Signal Butte, and Meridian roads.

An at-grade interchange similar to the existing interchange at Ellsworth Road would be constructed at Ironwood Road and would include additional turn lanes on Ironwood Road and new traffic signals. For the two existing paved cross roads, we propose to truncate the road at 222nd Street (Crismon Road) and at S. Mountain Road. Access would be maintained from Ellsworth Road to Pecos Road to 222nd Street and S. Mountain Road from the south. Access from the north would be maintained using S. Mountain Road from Baseline Road, and 222nd Street connects with Williams Field Road to S. Mountain Road. Another option would be to build the planned overpass at 222nd Street (Crismon) and/or S. Mountain Road; the need for this overpass and its cost would be evaluated in a revision to the ADOT DCR.

Task 2: Right-of-Way Cost Opinion Update

In May 2011, the Federal Highway Administration issued a Finding of No Significant Impacts (FONSI) for SR-24 (project NH-802-A(AUG), 802 MA 999 H6867 01L) for Phases I, II, and III to establish a freeway corridor between the SR 202L/Santan Freeway in the City of Mesa and Ironwood Road in Pinal County. For right-of-way purposes, Phase I of that clearance is defined as the freeway between SR 202L and Ellsworth Road, Phase II as the segment between Ellsworth Road and Meridian Road in Maricopa County, and Phase III between Meridian Road and Ironwood Road in Pinal County. In that report, the Phase II and III right-of-way costs were estimated at $64,855,000.

On September 18, 2014, Parsons met with Dave Edwards and Tom Flynn from the ADOT Right-of-Way Group to confirm this estimate and to identify potential right-of-way staging and cost opinions of an interim facility, split into segments as follows:

- Segment 1 between Ellsworth Road and Signal Butte Road
- Segment 2 between Signal Butte Road and Meridian Road
- Segment 3 between Meridian Road and Ironwood Road

The following tables offer probable costs in two different forms for consideration. Table 1 incorporates ADOT's actual and remaining expenditures to date for the Phase 1 Segment from SR 202L to Ellsworth. From this information and the area of right-of-way planned for purchase, a "hi cost/sq ft", a "low cost/sq ft, and an "average cost/sq ft were calculated. These costs per square foot were used, along with the anticipated square footage of right-of-way planned for purchase within the three segments described above to calculate the estimated costs for right-of-way within these three segments, as shown in Table 1.

Table 1: Right of Way Cost Presentation, Purchasing Segments 1,2, & 3 One at a Time								
Constructed Segment	ROW Area, sq ft	Hi Actual/ Project Cost (1)	Hi Cost /sq ft	Low Actual/ Projected Cost (1)	Low Cost/sq ft	Average Cost/sq ft	Total Estimated from Average	Notes
Phase 1 SR 202L to Ellsworth	7,210,706	$36,200,000	$5.02	$28,200,000	$3.91			165.5 acres
Proposed Segments	ROW Area	Hi Projected Cost	Hi Cost /sq ft	Low Projected Cost	Low Cost/ sq ft	Average Cost/sq ft		
Segment 1 Ellsworth to Signal Butte, 2.5 miles	7,869,864	$39,509,179	$5.02	$30,777,869	$3.91	$ 4.47	$35,143,524	180.7 acres
Segment 2 Signal Butte to Meridian, 1 mile	2,942,930	$14,774,429	$5.02	$11,509,362	$3.91	$4.47	$13,141,896	67.6 acres
SEGMENT 3 Meridian to Ironwood, 1.1 miles	3,411,155	$17,125,065	$5.02	$13,340,520	$3.91	$4.47	$15,232,793	78.3 acres
		$71,408,674		**$55,627,752**			**$63,518,213**	

(1) Results as Projected from Actual Information Provided by ADOT for the SR 202L to Ellsworth Road (Phase 1) Segment. ADOT has spent $25 million on all but two parcels within the SR 202L to Ellsworth segment. ADOT has two parcels that are currently in condemnation, where ADOT has offered a combined $3 million: however, property owners have countered at $11 million.

In Table 2, the results from Table 1 for Phase I were used to calculate the estimated cost for right-of-way for Segment 1. However, for Segment 2 and 3 there are two options: purchasing all of the right of way for all 3 segments at once or; purchasing each segment one at a time to coincide with construction of on segment at a time. As confirmed during discussions with ADOT, if all right-of-way is purchased at the same time, a reduced cost per square foot was considered possible in Segments 2 and 3. Purchasing the segments one at a time was considered to be considerably more expensive, both due to time-value and then the reality that wherever the freeway ends, the price/value of adjoining property immediately escalates in anticipation of what is to come. The results of these calculations are illustrated in Table 2.

Table 2: Another Cost Presentation, Purchasing Segments 1, 2, and 3 at the Same Time (1)								
Proposed Segments	ROW Area, sq ft	Hi Projected Cost	Hi Cost/ sq ft	Low Projected Cost	Low Cost/ sq ft (2)	Average Cost/ sq ft	Total Estimated From Average	Notes
Segment 1: Ellsworth to Signal Butte	7,869,864	$39,509,179	$5.02	$31,479,456	$3.91	$4.47	$35,140,174	180.7 acres
Segment 2: Signal Butte to Meridian	2,942,930	$14,774,429	$5.02	$8,828,790	$3.00	$4.01	$11,801,610	67.6 acres
Segment 3: Meridian to Ironwood	3,411,155	$17,125,065	$5.02	$6,822,310	$2.00	$3.51	$11,973,688	78.3 acres
		$71,408,674		**$47,130,556**			**$58,915,471**	

(1) Assume that price per square foot will decrease as SR-24 extends to the east, if purchased at the same time.
(2) These costs per square foot are based upon informed estimates, but have not yet been validated by market conditions or experts.

Disposition of current right-of-way in the SR-24 corridor is as follows:

- All but two parcels have been purchased for the Phase 1 segment (as originally defined) right-of-way from SR 202L to Ellsworth Road. To date, ADOT has paid $25 million. Those two parcels remain in condemnation.

- ADOT has offered $3 million for the two parcels that remain to be purchased within the SR 202L to Ellsworth Road segment. The property owners have countered with $11 million. Final negotiations are pending. The probable final right-of-way cost for this Phase 1 segment will range from $28 million to $36 million
- The Phase I SR 202L to Ellsworth Road segment of SR-24 design, construction, and ADOT internal costs were as follows:

Phase	Cost
Design	$10 million
Construction	$73 million
ADOT Internal Costs	$9 million
TOTAL	**$92 million**

- ADOT has not purchased any right-of-way east of Ellsworth Road.

On November 4, 2014, a meeting was held with representatives from ADOT, AECOM, MAG and Parsons to discuss the history of the SR-24 DCR development. At that meeting, the discussion centered on the possibility of eliminating the proposed drainage channel that parallels SR-24 to the north, with the assumption that area of development north of SR-24 would preempt much if not all of the storm flows. This realization led to an evaluation aimed at eliminating the channel and the right-of-way required for the channel. The estimated right-of-way costs from Table 1 and Table 2 would be reduced as shown in Tables 3 and 4.

Table 3: Estimated Reduced Right-of-Way Cost by Eliminating the Parallel North Drainage Channel, All Right-of-Way Purchased at the Same Time

Constructed Segment	ROW Area, sq ft	Hi Projected Cost (1)	Hi Cost/ sq ft	Low Projected Cost (1)	Low Cost/ sq ft	Average Cost/sq ft	Total Estimated from Average	Notes
202 to Ellsworth	7,210,706	$36,200,000	$ 5.02	$28,200,000	$3.91			165.5 acres
Proposed Segments	**ROW Area, sq ft**	**Hi Projected Cost**	**Hi Cost/sq ft**	**Low Projected Cost**	**Low Cost/sq ft**	**Average Cost/sq ft**		
Ellsworth to Signal Butte	7,869,864	$39,509,179	$5.02	$30,777,869	$3.91	$4.47	$35,143,524	180.7 acres
Eliminate Drainage Channel	(1,350,000)	$ (6,777,422)	$5.02	$ (5,279,649)	$3.91	$4.47	$ (6,028,536)	
Signal Butte to Meridian	2,942,930	$14,774,429	$5.02	$11,509,362	$3.91	$4.47	$13,141,896	67.6 acres
Eliminate Drainage Channel	(528,000)	$(2,650,725)	$5.02	$ (2,064,930)	$3.91	$4.47	$ (2,357,827)	
Meridian to Ironwood	3,411,155	$17,125,065	$5.02	$13,340,520	$3.91	$4.47	$15,232,793	78.3 acres
Eliminate Drainage Channel	(528,000)	$(2,650,725)	$5.02	$ (2,064,930)	$3.91	$4.47	$ (2,357,827)	
		$59,329,801		**$46,218,243**			**$52,774,022**	

(1) ADOT has spent $25.2 million on all but two parcels within the SR 202l to Ellsworth segment. ADOT has two parcels that are currently in condemnation. ADOT has offered a combined $3 million: however, property owners have countered at $11 million.

Table 4: Estimated Reduced Right-of-Way Cost by Eliminating the Parallel North Drainage Channel, Right-of-Way Purchased One Segment at a Time								
Constructed Segment	**ROW Area, sq ft**	**Hi Projected Cost (1)**	**Hi Cost/ sq ft**	**Low Projected Cost (1)**	**Low Cost/ sq ft**	**Average Cost/sq ft**	**Total Estimated from Average**	**Notes**
202 to Ellsworth	7,210,706	$36,200,000	$ 5.02	$28,200,000	$3.91			165.5 acres
Proposed Segments	**ROW Area, sq ft**	**Hi Projected Cost**	**Hi Cost/sq ft**	**Low Projected Cost**	**Low Cost/sq ft**	**Average Cost/sq ft**		
Ellsworth to Signal Butte	7,869,864	$39,509,179.38	$5.02	$31,479,456.00	$4.00	$ 4.51	$35,494,317.69	180.7 acres
Eliminate Drainage Channel	(1,350,000)	$(6,777,422.35)	$5.02	$(5,400,000.00)	$4.00	$4.51	$(6,088,711.17)	
Signal Butte to Meridian	2,942,930	$14,774,429.30	$5.02	$8,828,790.00	$3.00	$4.01	$11,801,609.65	67.6 acres
Eliminate Drainage Channel	(528,000)	$(2,650,725.19)	$5.02	$(1,584,000.00)	$3.00	$4.01	$(2,117,362.59)	
Meridian to Ironwood	3,411,155	$17,125,065.28	$5.02	$6,822,310.00	$2.00	$3.51	$11,973,687.64	78.3 acres
Eliminate Drainage Channel	(528,000)	$(2,650,725.19)	$5.02	$(1,056,000.00)	$2.00	$3.51	$(1,853,362.59)	
		$59,329,801.24		**$39,090,556.00**			**$49,210,178.62**	

(1) These costs per square foot are based upon informed estimates, but have not yet been validated by market conditions or experts.

Opportunities for MAG to consider are as follows:

- Working with MCFCD to construct the proposed channel from SR 202L to Ironwood Road independent of the SR 24 project(s). The channel will need continuity, while the roadway will likely be constructed in segments.
- Communicate with Eastmark (DMB) development and Arizona 24 developments (William Levine and Hill Properties of Canada) regarding the possibility of a mutual agreement and the benefit of constructing SR-24 well in advance of the current schedule (According to the current 20-year phased transportation development program incorporated in the 2035 MAG RTP Regional Transportation Plan (RTP dated, January 2014) the SR-24 corridor was identified for right-of-way protection as a Group 3 (FY 2027 - FY 2035) project. Establishing an interim corridor with access, if accelerated, would correspondingly accelerate

Figure 3: Eastmark Transportation Corridor Map

development adjacent to and beyond the corridor, a significant financial benefit to the Eastmark and Levine properties. This could serve the MAG region with reduced or more reasonable and predictable right-of-way costs for this corridor and alternatively, make more of the funding available to actually construct a contiguous roadway with regional connectivity, thus maximizing its benefit to the community. Paul Gilbert is the attorney who represents Levine. Jordan Rose of the Rose Law Firm represents Eastmark.

- A major shopping center is already designed (by Wendell Pickett) for the northeast corner of SR 24 and Ellsworth Road.

Task 3: Interim Facility Conceptual Layout

The original Task Order description for the feasibility study was to consider a four-lane divided facility with grading for future grade separations at planned SR 24 interchanges with Ellsworth, Williams Field, Signal Butte, Meridian, and Ironwood roads. Also considered were planned freeway overcrossings of Crismon and Mountain roads.

In a meeting with MAG staff on September 15, 2014, the request was made to prepare a construction cost estimate for the ultimate freeway for Segment 1, Ellsworth Road to Signal Butte Road. This strategy centered on an assumption or alternative that considered constructing the ultimate freeway for Segment 1, following with using the interim strategy to complete Segments 2 and 3.

3.1 Opinion of Cost, Construction of the Ultimate Condition, Segment 1, Ellsworth Road to Signal Butte

To complete that request, the following assumptions were made:

- Portland cement concrete pavement (PCCP) is 12 inches (the median depth and unit price used in the DCR)
- Excavation quantities were calculated using AECOM's surfaces (triangle volume) as well as its CADD files
- Cross road earthwork is not included at this time because there are no surfaces for them in the AECOM information provided.
- Construction does not include crossroads; it only includes ramps tying into the existing (e.g., no asphalt, no C&G, and no culverts).
- Removals are not included (it is assumed that these removals were mostly for existing crossroad items [e.g., C&G and barriers]).
- Unit prices were derived from ADOT's E2C2 online system to reflect the most current unit pricing available and to update those unit prices used previously in the Final DCR.

For this Segment 1 ultimate freeway construction strategy and primarily for comparative purposes, the Segment 1 estimate that follows has been broken into the following three estimates:

1. Ultimate Freeway Construction, Roadway only
2. Ultimate Freeway Construction, Structures only
3. Ultimate Freeway Construction, Drainage Channel only.

This was done to allow further construction cost versus available funding evaluations after this report is published.

The results of these three estimates and their component parts are described in Tables 5, 6, and 7.

Table 5: Segment 1 – Ultimate Freeway Construction, Roadway Only					
Item No.	Item Description	Unit	Quantity	Unit Price	Extended Amount
2030301	Roadway Excavation	cu yd	1,342,221	$6.00	$8,053,326.00
2030900	Borrow (in place)	cu yd	1,208,444	$10.00	$12,084,440.00
3030022	Aggregate Base, Class 2	cu yd	24,031	$20.00	$480,621.59
4010012	Portland Cement Concrete Pavement (12" PCCP / 4" AB)	sq yd	216,280	$40.00	$8,651,188.56
414XX02	Asphaltic Concrete (AR-ACFC, 1" overlay)	sq yd	216,280	$5.00	$1,081,398.57
	Drainage	L. sum	1	$2,264,933.33	$2,264,933.33
	Bridge Sign Structures	L. sum	1	$1,091,733.33	$1,091,733.33
	Signing & Marking	L. sum	1	$2,970,333.33	$2,970,333.33
	Retaining Wall	L. sum	1	$1,578,000.00	$1,578,000.00
	Landscape	L. sum	1	$4,342,533.33	$4,342,533.33
	Water/Sewer	L. sum	1	$190,666.67	$190,666.67
9020004	Chain Link Fence, Type 1 (72")	L ft	26,340	$5.00	$131,700.00
9040201	Median Cable Barrier (	L ft	11,525	$15.00	$172,875.00
9040221	Median Cable Barrier Anchor	each	12	$2,500.00	$30,000.00
9040223	Median Cable Barrier End Terminal	each	12	$2,500.00	$30,000.00
9080084	Concrete Curb And Gutter	L ft	41,197	$15.00	$617,955.00
9100000	Concrete Barrier	L ft	6,730	$60.00	$403,800.00
9240051	Misc Work (waste water bypass pumping operations)	L. sum	1	$250,000.00	$250,000.00
9240077	Misc Work (water system line stopping & bypass)	L. sum	1	$300,000.00	$300,000.00
9240119	Miscellaneous Work (high mast pole maintenance pad)	each	28	$2,000.00	$56,000.00
9999903A	Side Weir Spillway Into Ellsworth Basin	L. sum	1	$309,400.00	$309,400.00
9999903B	RCB Culvert (4-10'x8'x180') (Ellsworth Rd)	L. sum	1	$549,100.00	$549,100.00
9999903F	RCB Culvert (4-10'x4'x650') (Ellsworth Basin)	L. sum	1	$151,600.00	$151,600.00
9999903G	RCB Culvert (3-12'x8'x200') (Williams Field Rd)	L. sum	1	$563,400.00	$563,400.00
9999903H	RCB Culvert (3-8'x8'x200') (Crismon Rd)	L. sum	1	$371,600.00	$371,600.00
				Roadway Subtotal:	$46,726,604.72
				Design Engineering: 8.00%	$3,738,128.00
				Construction Engineering: 9.00%	$4,205,394.00
				Consultant Services: 1.00%	$467,266.00
				Construction Contingencies: 10.00%	$4,672,660.00
				Project Subtotal	$59,810,052.72
				ICAP: 10.39%	$4,854,894.23
				Project Total:	$64,664,946.95

Table 6: Segment 1 – Ultimate Freeway Construction, Structures Only				
Item Description	**Unit**	**Quantity**	**Unit Price**	**Extended Amount**
Ellsworth Road Overpass (EB)	L. sum	1	$2,223,300.00	$2,223,300.00
Ellsworth Road Overpass (WB)	L. sum	1	$2,223,300.00	$2,223,300.00
Williams Field Road Overpass (EB)	L. sum	1	$2,223,300.00	$2,223,300.00
Williams Field Road Overpass (WB)	L. sum	1	$2,223,300.00	$2,223,300.00
Crismon Road Overpass	L. sum	1	$4,309,000.00	$4,309,000.00
			Structures Subtotal:	**$13,202,200.00**
			Design Engineering: **8.00%**	**$1,056,176.00**
			Construction Engineering: **9.00%**	**$1,188,198.00**
			Consultant Services: **1.00%**	**$132,022.00**
			Construction Contingencies: **10.00%**	**$1,320,220.00**
			Structures Subtotal:	**$16,898,816.00**
			ICAP: **10.39%**	**$1,755,786.98**
			Structures Total:	**$20,026,311.56**

Table 7: Segment 1 – Ultimate Freeway Construction, Ultimate Drainage Channel and Pump Station Only (1)				
Item Description	**Unit**	**Quantity**	**Unit Price**	**Extended Amount**
Channel Excavation	L. sum	1	$1,269,200.00	$1,269,200.00
Concrete Channel Lining (6 inch)	L. sum	1	$5,379,266.67	$5,379,266.67
Signal Butte Lift Station	L. sum	1	$5,605,000.00	$5,605,000.00
			Drainage Channel Subtotal:	**$12,253,466.67**
			Design Engineering: **8.00%**	**$980,277.00**
			Construction Engineering: **9.00%**	**$504,450.00**
			Consultant Services: **1.00%**	**$56,050.00**
			Construction Contingencies: **10.00%**	**$560,500.00**
			$12,253,466.67	**$14,354,743.67**
			ICAP: **10.39%**	**$1,491,457.87**
			Drainage Channel Total:	**$15,846,201.53**
(1) Note that the Phase I project did not construct the drainage channel. Retention areas were constructed within the mainline footprint as well as in the northwest corner of Ellsworth and SR-24.				

3.2 Opinion of Cost, Construction of the Interim Condition

The original task description for this feasibility study was to consider a four-lane divided facility with provision for future grade separations at planned SR-24 interchanges with Ellsworth, Williams Field, Signal Butte, Meridian, and Ironwood roads. The planned freeway overcrossings of Crismon and Mountain roads were also to be considered.

In the initial effort, three options, predominantly as they relate to the typical section (see Figure 6), were considered. One of those options was further split into two suboptions. Any of these options could be implemented within any of the segments to achieve the most desirable financial balance. These options, illustrated in the attached graphics, are described in the following subsections.

Option A1: Undivided, Two Lanes in Each Direction

The strategy behind Option A1 would be to provide a simple four-lane typical section using the SR-24 mainline horizontal geometry as proposed in the original DCR. This option, as illustrated in the attached typical section, includes the following:

- 8-foot paved outside shoulders (required).
- 12-foot travel lanes (something that should also be considered is the use of 13-foot inside lanes to better line up with future pavement and provide an increased buffer between opposing lanes of traffic).
- At-grade intersections at crossroads. Intersections, depending upon warrants, could be controlled with signs, signals, or roundabouts.
- Cul-de-sacs on roadways that have no planned future connection to the ultimate freeway.

With this option, the middle 26' of pavement would not be utilized in the ultimate freeway typical section (the ultimate typical section has a 26' graded median).

Option A2: Divided, Two Lanes in Each Direction

The strategy behind Option A2, as illustrated in Figure 6, would provide a simple four-lane typical section using the SR-24 mainline horizontal geometry as proposed in the original DCR. Opposing lanes of traffic would be separated by the 26-foot graded median planned for the ultimate freeway typical section. This option would make use of the interim pavement surface in the ultimate condition. This option further includes the following:

- 4-foot paved inside shoulders and 10-foot paved outside shoulders (required).
- Roadway pavement placed in the ultimate location using either PCCP or AC.
- Interim striping placed in the ultimate location.
- Construction of some of the ultimate drainage plan within the 26-foot median.
- At-grade intersections at crossroads. Depending on warrants, intersections could be controlled with signs, signals, or roundabouts.
- Cul-de-sacs on roadways that have no planned future connection to the freeway.

With this option, the interim outside edge of pavement would be 8' into the future 12' lane.

Option B: Undivided, One Lane in Each Direction

Option B would implement the horizontal geometry of the future ramps from the crossroad to the mainline. From the mainline and between ramp terminals, a temporary alignment could be incorporated that largely uses the mainline offset to the outside lane(s) and auxiliary lanes (see attached typical section, Fugure 6). This option could be implemented using the eastbound or westbound ramp alignments from crossroad to crossroad because it is intended to be a two-lane roadway separated by a double yellow stripe. This configuration could be considered as the lowest cost option for implementation within the segment(s) that are anticipated to have the lowest traffic volumes, or to meet the objective to provide a continuous 4.6-mile corridor at the least cost. This option further includes the following:

- 8-foot paved outside shoulders (rural two-lane DHV > 200 vph requires 8-foot shoulders; DHV < 200 vph has 6-foot paved outside shoulder).
- Roadway pavement placed in the ultimate location using either PCCP or AC.
- Striping for this option would only function in the interim condition.
- The outside edge of pavement would be out of the wheel path in the ultimate lane configuration (6 feet or in the middle of the travel lane).
- At-grade intersections at crossroads. Depending on warrants, intersections could be controlled with signs, signals, or roundabouts.
- Cul-de-sacs on roadways that have no planned future connection to the freeway.
- An opportunity to construct the mainline in the future and maintain traffic during construction.

Table 8: Option B – Interim Two-Lane Roadway Estimate of Construction Cost

Proposed Segment	Length (miles)	Roadway construction cost/mile	Estimated Road Construction Cost	Estimated Design Cost (@ 8% of construction)	10% Contingency	10.39% ADOT ICAP	9% Construction Engineering	Total
Segment 1: Ellsworth to Signal Butte	2.5	$6,000,000	$15,000,000	$1,200,000	$1,500,000	$1,558,500	$1,350,000	$20,608,500
Segment 2: Signal Butte to Meridian	1	$6,000,000	$6,000,000	$480,000	$600,000	$623,400	$540,000	$8,243,400
Segment 3: Meridian to Ironwood	1.1	$6,000,000	$6,600,000	$528,000	$660,000	$685,740	$594,000	$9,067,740
			$27,600,000	**$2,208,000**	**$2,760,000**	**$2,867,640**	**$2,484,000**	**$37,919,640**

Option C: Divided, Two Lanes in Each Direction

Option C (see typical section, Figure 6) also would implement the horizontal geometry of the future ramps from the crossroad to the mainline. From the mainline and between ramp terminals, a temporary alignment could be incorporated that largely uses the mainline offset to the outside lane(s) and auxiliary lanes. This configuration would provide the capacity for a two-lane, median-divided roadway with the greatest separation between directions of travel. Furthermore, the space between roadways would accommodate the ultimate freeway alignment and location. This option also includes the following:

- 6-foot paved inside shoulders and 12-foot outside paved shoulders.
- Roadway pavement placed in the ultimate location using either PCCP or AC.
- Interim striping placed in the ultimate location (auxiliary lane included)
- An outside edge of pavement that would be out of the wheel path in the ultimate lane configuration (in the middle of the ultimate travel lane).
- The opportunity to place some of the ultimate grading, drainage systems, and drainage structures within the interim median area — the ultimate location for the freeway mainline.
- At-grade intersections at crossroads. Depending on warrants, intersections could be controlled with signs, signals, or roundabouts.
- Cul-de-sacs on roadways that have no planned future connection to the freeway.
- An opportunity to construct the mainline in the future, at-grade, separate from and adjacent to the operating roadway. At that time, the interim roadway will serve to maintain traffic during construction of the ultimate freeway.

In all options, the shoulders could allow for a buffer between the construction zones and active traffic (the 6-foot inside shoulders will allow for 2-foot temporary shoulders on either side of a temporary barrier).

Cost Comparisons

For comparative purposes, this project compares with a recently completed 3.1 miles of an interim connection for Northern Parkway for from Sarival to Dysart for MCDOT by Parsons. The construction cost of that project was $31 million. That roadway included the following components, which are very similar to the typical section for Options A1, A2, and C:

- Two lanes each direction, 6-foot inside shoulder, 10-foot outside shoulder.
- PCCP pavement (13 inches over 4-inch AB). (Note that replacing this PCCP pavement structural section with 6-inches of AC over 6-inch AB would decrease the estimated construction cost by approximately $500,000/mile.)
- Interim embankment constructed for future bridges at Reems and Litchfield (both of which were constructed soon after the roadway was completed).
- Some retaining walls.
- At-grade crossings at Reems and Litchfield Roads (ramps tying into improved crossroads, identical to that described for this SR 24 interim roadway).

The Northern Parkway project also constructed a 3.1-mile-long channel. The construction cost of that channel (not included in the roadway construction cost above, included the following:

- Channel excavation: $451,000
- Channel lining: $4.2 million

No pump station was required for this segment of Northern Parkway.

A landscaping package was also separate from the above two items and has not yet been constructed. Its estimated construction cost is approximately $2.7 million with contingencies.

Table 9 summarizes the interim construction cost by segment. This estimate does not include costs for right-of-way, drainage channels, future landscaping, or bridges (covered previously).

Table 9: Option A1, A2, and C – Interim Four-Lane Roadway Estimate of Construction Cost

Proposed Segment	Length (miles)	Roadway Construction Cost/Mile	Estimated Road Construction Cost	Estimated Design Cost (@ 8% of construction)	10% Contingency	10.39% ADOT ICAP	9% Construction Engineering	Total
Segment 1: Ellsworth to Signal Butte	2.5	$10,000,000	$25,000,000	$2,000,000	$2,500,000	$2,597,500	$2,250,000	$34,347,500
Segment 2: Signal Butte to Meridian	1	$10,,000,000	$10,000,000	$800,000	$1,000,000	$1,039,000	$900,000	$17,739,000
Segment 3: Meridian to Ironwood	1.1	$10,000,000	$11,000,000	$880,000	$1,100,000	$1,142,900	$990,000	$15,112,900
			$46,000,000	**$3,680,000**	**$4,600,000**	**$4,779,400**	**$4,140,000**	**$67,199,400**

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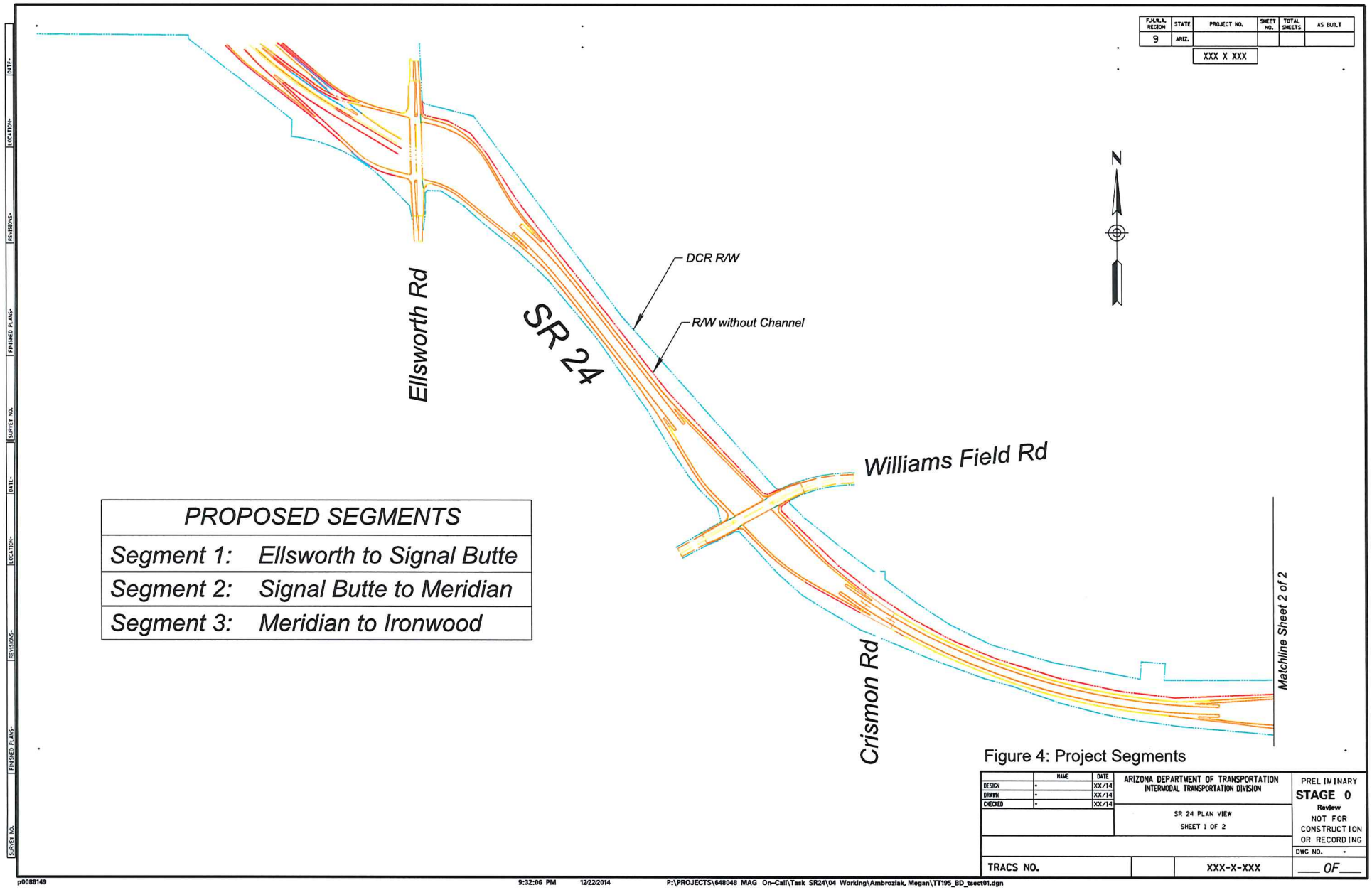
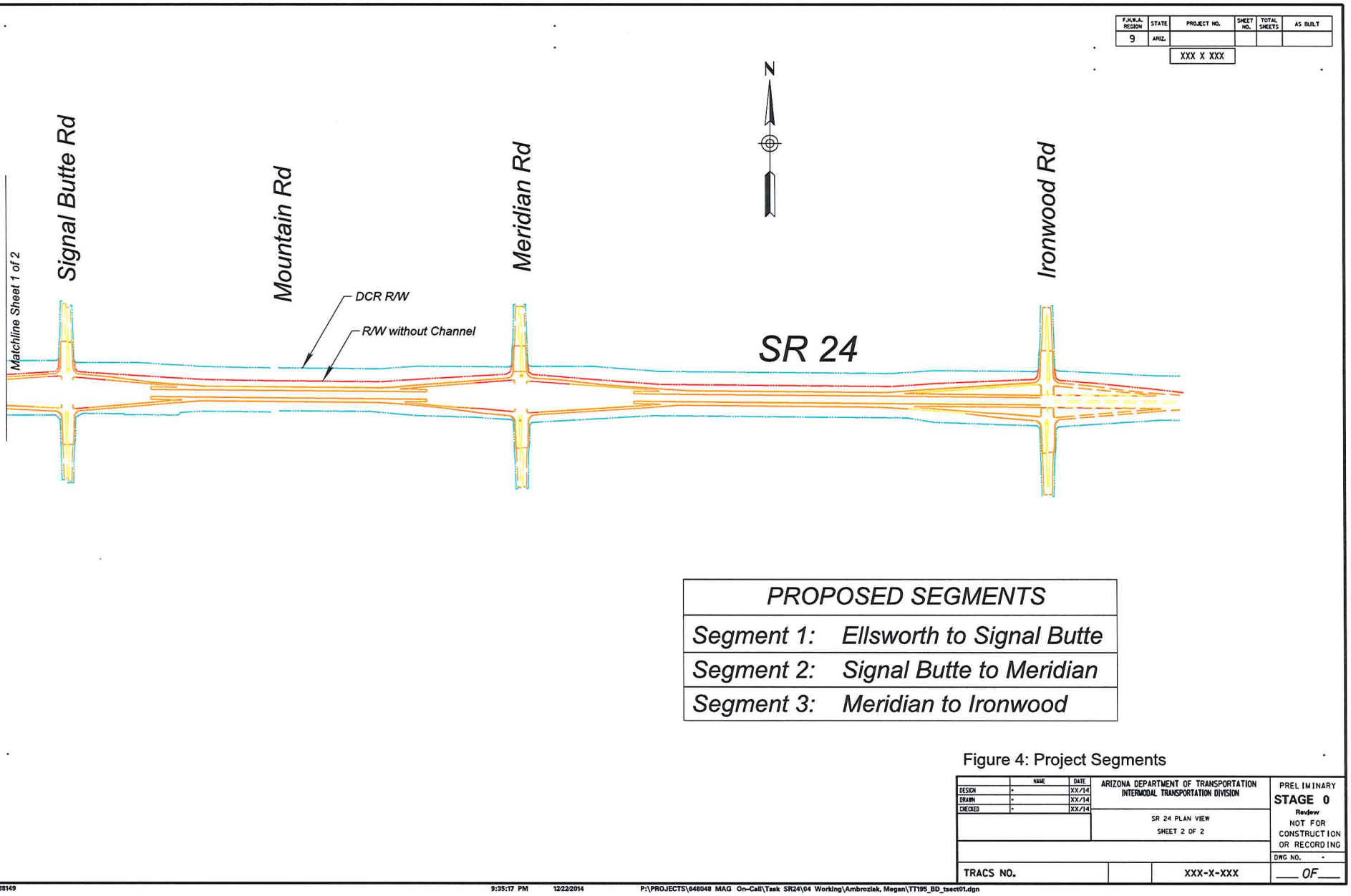


Figure 4: Project Segments



PROPOSED SEGMENTS	
Segment 1:	Ellsworth to Signal Butte
Segment 2:	Signal Butte to Meridian
Segment 3:	Meridian to Ironwood

Figure 4: Project Segments

F.H.W.A. REGION	STATE	PROJECT NO.	SHEET NO.	TOTAL SHEETS	AS BUILT
9	ARIZ.				

XXX X XXX

	NAME	DATE
DESIGN	-	XX/14
DRAWN	-	XX/14
CHECKED	-	XX/14

ARIZONA DEPARTMENT OF TRANSPORTATION
INTERMODAL TRANSPORTATION DIVISION

SR 24 PLAN VIEW
SHEET 2 OF 2

PRELIMINARY
STAGE 0
Review
NOT FOR CONSTRUCTION OR RECORDING

DWG NO. -

TRACS NO. | XXX-X-XXX | ___ OF ___

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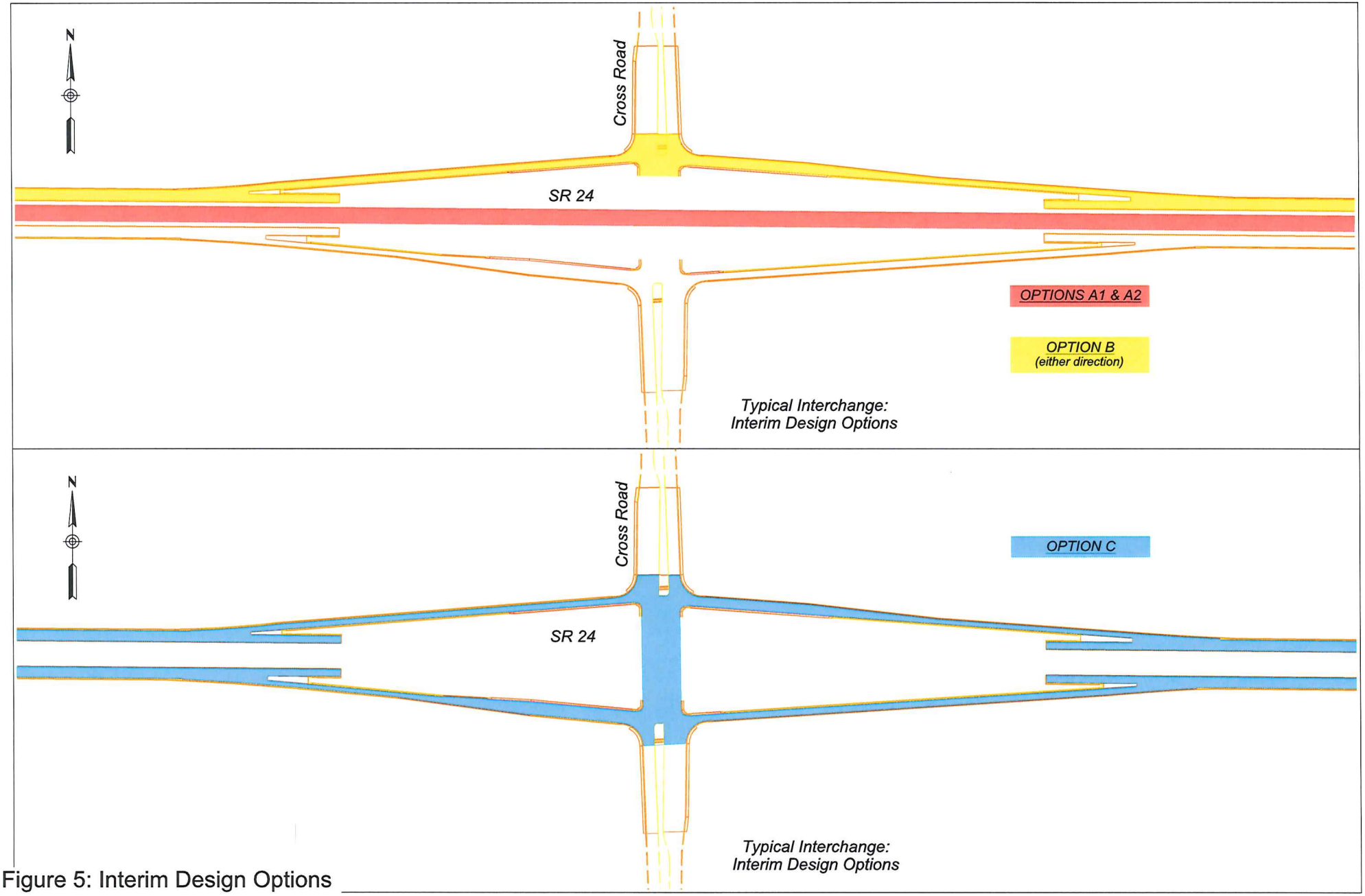
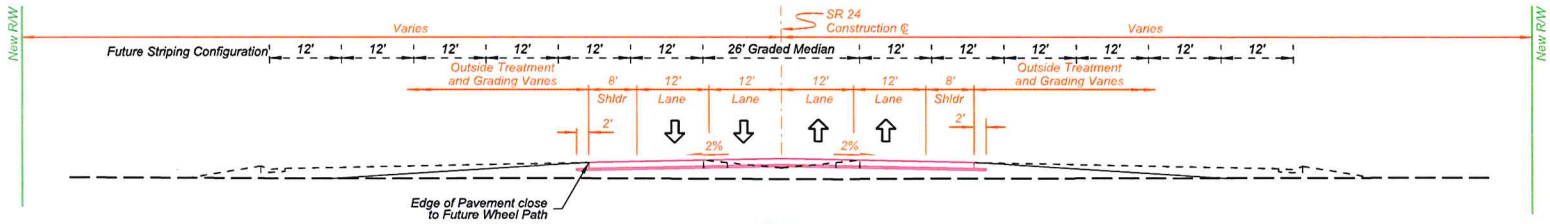


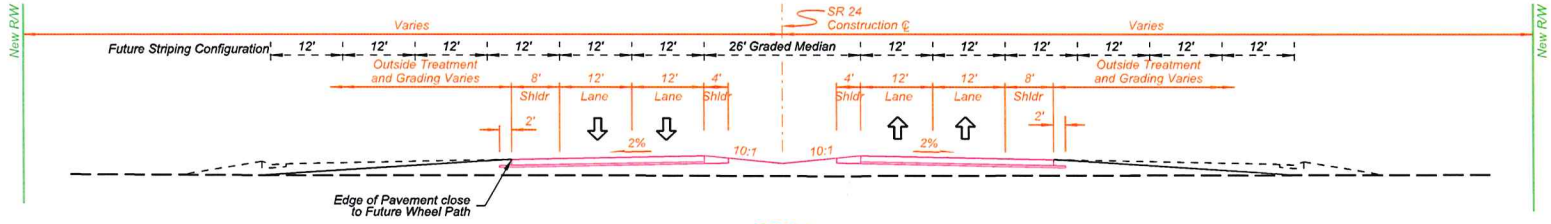
Figure 5: Interim Design Options



SR 24

OPTION A1

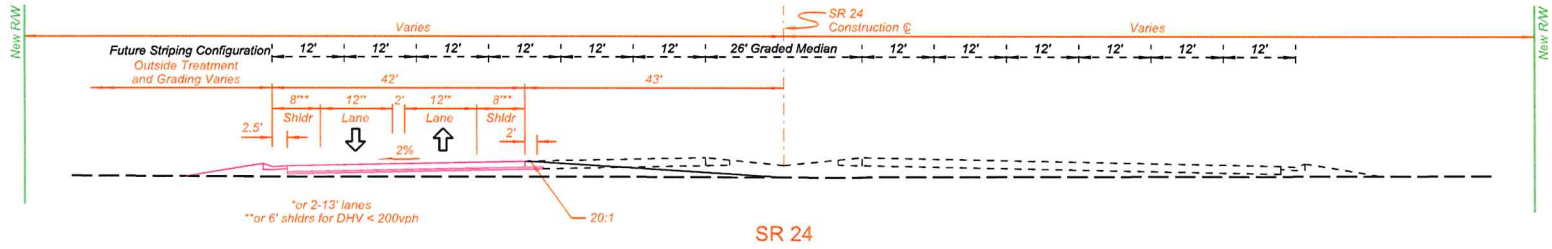
Throwaway Pavement In Median
Interim Striping



SR 24

OPTION A2

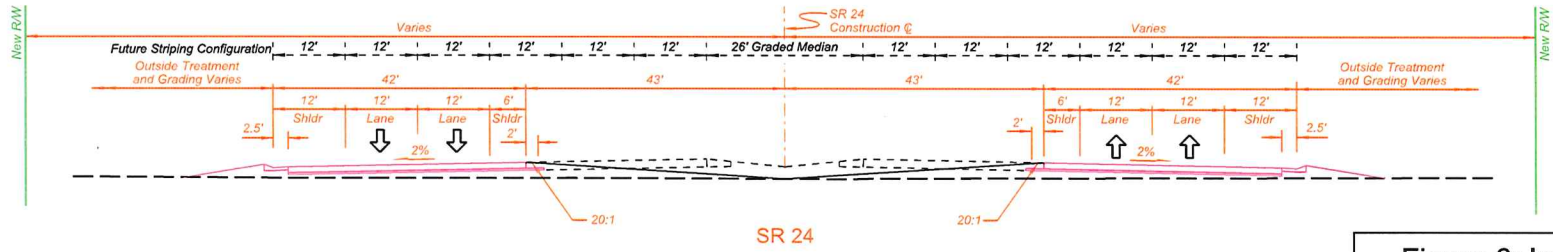
Ultimate Pavement
Ultimate Graded Median
Ultimate Striping



SR 24

OPTION B

Ultimate Pavement
Ultimate C&G
Interim Striping



SR 24

OPTION C

Ultimate Pavement
Ultimate C&G in both directions
Ultimate Striping

Figure 6: Interim Typical Section Options